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Conclusion.

The results of this work indicate that if the new Standard Methods (1917) be adhered to, in the bacteriological examination of water, time, labor, and material will be unnecessarily expended and misleading results may be obtained.

THE SIMULATION OF DISEASE.

DRUGS, CHEMICALS, AND SEPTIC MATERIALS USED THEREFOR.

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This paper is not intended to be an exposé of all of the various methods of effecting simulation of disease, but is restricted to that phase of the subject involving the use of drugs, chemicals, and septic materials. This phase is of special interest at the present time, as it comprises the means most frequently employed by unscrupulous individuals in attempts to evade military duty. For the purpose of enhancing the value of the paper as a source of reference to the medical examiner, the substances enumerated therein are grouped under the diseases the diagnostic signs of which their use is intended to simulate. For the same reason, brief outlines of the methods recommended for the detection of these frauds are also included, where specific information of this kind has been available.

Substances used in the Simulation of Diseases of the Skin and Subcutaneous Tissue.

Erythema:[1] Certain nettles, poison ivy, squills, and some plants of the families *Euphorbiaceæ* and *Ranunculaceæ*. These are applied to the skin with friction.

Eczema: After abrading the skin, by scraping with a sharp-edged instrument or rubbing with some rough material, one, or more, of the following is applied: Croton oil, sulphur, acid substances, oil of cade, ointment of mercury, or mezereum bark.

Detection: According to Blum (1916), the eruptions produced may be distinguished from those of the true disease by the fact that they are disseminated and do not form confluent masses. Furthermore, the skin, after the removal of the crust, does not appear red, dry, and hypertrophied, as in true eczema.

Herpes: Certain plants of the family *Euphorbiaceæ*, applied to the skin.

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[1] The presence of the diagnostic signs simulating erythema is not always an indication of fraud. Very often workers in various trades may have raw erythematous appearing hands. As examples of this kind, Collie (1916) gives the following: Hair dressers, through the use of alkaline shampooing liquids; French polishers, through the use of potassium dichromate; carpenters, working with teak or rose wood; tanners, handling arsenic; masons, through the handling of silicates; photographers, through the action of liquids containing chlorine; painters, and those engaged in handling aniline dyes or strong alkalies.

Detection: The location and distribution of the lesions is usually so paradoxical as to indicate fraud at first appearance.

IMPETIGO: Cantharidal plaster, or ointment of tartar emetic, applied locally.

OTHER ERUPTIVE DISEASES:[1] Iodides, bromides, arsenic or mercury taken internally. Phenol, cantharides, mustard seeds or croton oil applied externally.

ULCERS: Potash or soda lye, sulphuric acid, hydrochloric acid, nitrohydrochloric acid, or a strong solution of zinc chloride applied externally. A case of sloughing ulcer caused by the repeated application of a hot copper cent to the skin of the arm is reported by Bispham (1914).

Detection: Ascarelli (1917) states that the diagnosis of fraud is not difficult in these cases. He, however, advises a general examination of the suspect to exclude other conditions which might explain the occurrence of the ulcer, namely: syphilis, diabetes, syringomyelia, varix, etc.

ABSCESS: Commonly produced by inserting beneath the skin a thread smeared with tartar from the teeth, saliva or fæcal matter.

Detection: Blum (1916) states that the pus, obtained upon incision, has an odor similar to that obtained from an abscess of the alimentary tract, this being sufficiently characteristic to identify the fraud.

PHLEGMONS: Gasoline, kerosene, oil of turpentine, or a solution of chloride of lime is injected subcutaneously.

Detection: Chavigny (1916), who has made a special study of these artificially produced phlegmons, describes their characteristics as follows: They generally occur in epidemics, and the site of the lesions in these epidemics is usually the same, namely, the knee or immediate neighborhood. They resemble true phlegmons in outward appearance, but are not painful. When in the region of the knee, the flexion of the joint is not hindered and lymph gland enlargement is absent or only slight. They rarely show a thermal reaction above 38.5° C. The pus is asceptic and shows a predominance of mononuclears. The red blood cells are well preserved and show no evidence of autolytic changes. When the phlegmon is the result of the injection of oil of turpentine, the pus is a dirty red in color and contains numerous granular masses. If due to use of gasoline the color is a dirty white. It is homogeneous, and of the consistence of a viscous jelly. In neither case does the pus have the odor of the injected liquid. When kerosene is the agent employed, however, the odor is sufficiently pronounced to be used as evidence of fraud.[1]

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[1] The drugs which are known to give rise to eruptions when taken internally are almost in number. Many of them are administered for legitimate purposes, and care should therefore be exercised in pronouncing a case fraudulent.

LIPOMA: Paraffin injected subcutaneously.

ŒDEMA OF THE HANDS AND FEET: Friction between the fingers or toes with a stalk of a species of horsetail (*Equisetum arvense*). The resulting inflammation is said closely to resemble œdema.

Substances used in the Simulation of Diseases of the Eye.

INFLAMMATORY DISEASES: The following have been placed under the eyelid: ipecac, castor-oil seed, cantharides, lime, silver nitrate, red mercuric oxide, copper sulphate, acid lotions, urine, fæcal matter and putrid matter.

MYDRIASIS: The preparations and alkaloids of belladonna, hyoscyamus and stramonium placed in the eye.

MYOSIS: Lobeline placed in the eye.

Detection: The simulation of mydriasis, or myosis, by the above means, can be most easily discovered by isolating the suspect and keeping him under close observation.

Substances used in the Simulation of Diseases of the Ear.

OTITIS: Urine, fæcal matter and chemicals (specific names not mentioned) are reported as having been inserted into the auditory canal for this purpose.

Detection: The presence of lesions in the meatus and concha may reveal the artificial nature of the disease (Ascarelli, 1917).

Substances used in the Simulation of Diseases of the Throat.

ACUTE TONSILLITIS: Irritating solutions used as a gargle.

Detection: Febrile phenomena are absent. The inflammation is not confined to the tonsils but extends to all parts touched by the liquid (Blum, 1916).

Substances used in the Simulation of Diseases of the Respiratory System.

HÆMOPTYSIS: Colored substances, such as carmine or beet juice, to color the sputum. The blood of animals (chicken) is also reported as having been used for this purpose.

Detection: Fraud of this nature is, usually, readily detected by a microscopical examination of the sputum.

Substances used in the Simulation of Diseases of the Digestive System.

GASTRIC DERANGEMENTS: A mixture of oil and tobacco is frequently imbibed for this purpose. Blum (1916) states that the gastric symptoms which follow may be accompanied by a rapid heart and icterus.

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[1] A method for the isolation of the gasoline, kerosene, or oil of turpentine present in the pus obtained from these artificially produced phlegmons has been reported by Ed. Lasausse (1916). Chemical tests for the identification of these substances have also been described by this author.

Detection: An examination of the stomach contents is the best means of detecting this form of fraud.

DIARRHŒA: Purgatives are reported as having been employed for this purpose. Another means of effecting simulation is the dilution of the fæces with urine or water. In attempts to simulate dysentery, small pieces of meat and pork fat are added to the fæces thus diluted.

Detection: Procedure of this kind can be most easily discovered by isolating the suspect and keeping him under observation. During this period, the fæces and urine should be collected in separate vessels.

ICTERUS:[1] Walnut juice and liquid preparations of curcuma, applied externally, picric acid taken internally.

Detection: Attempts to simulate the diagnostic signs of jaundice by the use of external applications are so crude that they may be detected with ease.

For the detection of the use of picric acid, a number of methods have been devised. Among the best of these are the methods of Le Mithouard (1915), Derrien (see Grimbert, 1916), and Pecker (1916), in which picric acid or its derivatives are identified in the urine, and the methods of Pognan and Sauton (1915) and Tixier and Bernard (1917), in which picric acid or its derivatives are sought for in the blood. The last-mentioned method is given here because of its simplicity and sensitiveness. It is carried out as follows: Add 15 drops of blood, drawn from the tip of the finger of the suspected simulator, to 3 cubic centimeters of salt solution (0.95 per cent), contained in a small glass tube, and shake two or three times. After allowing the mixture to stand at room temperature for 24 hours, draw off, by means of a pipette, 1 to 2 cubic centimeters of the salt solution. The latter will be colored faintly yellow, in case the icterus is due to the ingestion of picric acid. Add an equal volume of a solution of methylene blue (1:50,000) and shake vigorously, then 15 drops of chloroform [2] and shake again. If picric acid derivatives are present, the chloroformic solution, which separates on standing, will appear light green to deep green (bottle green) in color, depending on the quantity of the acid derivatives present.

Substances used in the Simulation of Diseases of the Circulatory System.

RAPID HEART: Cordite (an explosive consisting of a mixture of guncotton and vaseline) is reported as having been chewed for this purpose.

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[1] A recent report of the Royal Society of Medicine shows that toxic jaundice in munition workers may be due to the handling of trinitrotoluene or tetrachlorethane. A sufficient amount of these substances to produce the symptoms of jaundice is stated to be absorbed through the skin.

[2] If ether is substituted for the chloroform, there is less danger of forming a troublesome emulsion.

Note: Newspaper reports indicate that perhaps other substances are being employed for this purpose. Attention is, therefore, invited to some of the substances which might be used, namely: Nitroglycerin in the form of the spirit or tablet, atropine or belladonna and its preparations, or caffeine.

Substances used in the Simulation of Diseases of the Kidneys.

ALBUMINURIA: Sodium chloride and milk, consumed in large quantities for several days. Blum (1917) states that this is the method commonly employed by those who are predisposed to the disease. Another method consists of the injection of albumin into the bladder.

Detection: Isolate the suspect and keep him under observation. In case of fraud, the albumin will disappear from the urine in a few days.

Substances used in the Simulation of Diseases of Metabolism.

DIABETES MELLITUS: Phloridzin taken *per os* or injected subcutaneously, ammonium oxalate *per os,* or glucose injected directly into the bladder.

Detection: Phloridzin is excreted in the urine, and may be identified therein by the method of Marcuse (1897), which is as follows: To 5 cubic centimeters of the suspected urine, contained in a test tube, add a few drops of ferric chloride test solution. The mixture will assume a bright red color, if phloridzin is present.

Certain other substances give a similar color reaction, namely: Acetoacetic acid, phenacetin, antipyrin and salicylic acid.

In case the color is due to the presence of salicylic acid the mixture will be decolorized on adding a few drops of hydrochloric acid and shaking with ether.

To test for antipyrin, add a few drops of Lugol's solution to a small quantity of the urine, previously diluted with 20 volumes of water and acidified with hydrochloric acid. The presence of antipyrin will be indicated by the formation of a characteristic precipitate.

To determine whether or not glucose has been injected into the bladder, empty the latter and wash out with a solution of boric acid. Collect a sample of urine two or three hours later and examine. The absence of sugar indicates fraud.

GENERAL DEBILITY OR PHYSICAL EXHAUSTION: Vinegar consumed in excessive amounts; tobacco (excessive use of); arsenious acid, mercury, or lead salts, taken internally for a period of time sufficiently long to cause the appearance of toxic symptoms.

Substances used in the Simulation of other Diseased Conditions.

FEVER: A peeled tooth of garlic inserted into the anus and allowed to remain for 24 hours, or the same substance crushed and rubbed into the axillae (Perez, 1917).

HERNIA: Paraffin injected into the scrotum.

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